

AMENDMENTS TO THE SPECIFICATION:

Page 1, before line 3, insert the following as separate paragraphs:

--BACKGROUND

1. Technical Field--.

Page 1, line 5, insert the following as a separate paragraph:

--2. Description of Related Art--.

Page 2, before line 12, insert the following as a separate paragraph:

--BRIEF SUMMARY OF EXEMPLARY EMBODIMENTS--.

Page 4, before line 27, insert the following as a separate paragraph:

--BRIEF DESCRIPTION OF THE DRAWINGS--.

Please amend the paragraph beginning at page 5, line 25, as follows:

Figure 14a is a schematic diagram showing an arrangement of diary assistants according to a fifth embodiment, together with Figure 14b which shows a graphical display of a host diary preference function according to the fifth embodiment.

Page 7, after line 5, insert the following as a separate paragraph:

--DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS--.

Please amend the paragraph beginning at page 9, line 21, as follows:

Co-ordination of information in the form of inter-agent collaboration has been presented as a feature of many known systems such as the ZEUS system, ~~discussed above,~~ and the present system 219 similarly performs such interactions (albeit that the implementation of collaboration is different). However, system 219 addition provides co-ordination of the presentation of information to the user, which involves considering the constraints of an addition entity, the user (although the entity may be another agent, or process). In general, after an agent has completed its task, its next course of action will be to present the corresponding task results to the user. However, in the absence of some means of controlling when these results are presented, the user may be overloaded with information from many agents simultaneously. Thus co-ordination of agent information is necessary to avoid increasing the cognitive load on the user. This co-ordination typically includes managing the interaction between the agents and the user; performing tasks on behalf of the user that requires the action of more than one agent; and scheduling actions to be performed at appropriate times. This therefore involves receiving task information from other agents, processing the task information into executable system actions, such as the action of allowing an agent to display information to the user, and maintaining a temporal database of these system actions. Although the system disclosed in patent application W099/05597 (~~described above~~) is able to schedule and re-schedule tasks, the issue of scheduling presentation of task information to the user so as to avoid a communication overload at any one time is not addressed.

Please amend the paragraph beginning at page 10, line 20, as follows:

The co-ordinator 305 functions under the control of ~~means 403~~controller, which may be provided by Java threads, although it is understood that the use of Java is inessential to the co-ordinator and that any other method of concurrently running multiple processes would provide the ~~means 403~~controller. Java is a good choice of language for developing multi-agent applications because of its object-oriented and multithreaded characteristics, enabling each agent to comprise many objects and several threads. It also has the advantage of being portable across operating systems, as well as providing a rich set of class libraries that include excellent network communication facilities.

Please amend the paragraph beginning at page 14, line 7, as follows:

As can be appreciated from the foregoing description, the co-ordinator 305 is not a centralised controller for the system 219. Although the co-ordinator 305 can request the agents 201,203,205,207,209,211 to effect execution 309 of the tasks passed from the co-ordinator 305, the agents may not perform these tasks. The agents communicate with each other using the Zeus Open Messaging Architecture (~~detailed in footnote 1~~), and they 201,203,205,207,209,211 operate mostly under the operation of the user, although as described above, notification of information to the user is routed through the co-ordinator 305 as shown in Figure 2 by the squares 241. In Figure 2, the ellipses 243 represent requests from the coordinator 305 to the agents, and may correspond to the information for effecting task execution 309. The diamonds 245 represent a record of the user's preferences or interests, having been extracted from a database 247 containing user profile data. Thus the agents 201,203 linked to the diamonds 245 may be web and yellow pages assistants.

Please amend the paragraph beginning at page 16, line 17, as follows:

When the agents 201, 203 have finished searching, they have to notify the user of the results. This is routed via the co-ordinator 305, shown by squares 44 on Figure 3, in order to determine whether the user is able to accept interrupts. The co-ordinator 305 accesses the world model 313, which includes details of all of the user's current and future tasks and the interruption status, in order to anticipate a next available timeslot to interrupt the user with the information. Once a timeslot has been ascertained, the co-ordinator 305 may pass an information task 311, including the ascertained time as a parameter, to the scheduling means 307 and this is scheduled in with other user's tasks in the manner described above (goal 427-plan 429 - instantiate 431 and schedule 433-send to execute 309 by another agent if required).

Please amend the paragraph beginning at page 18, line 29, as follows:

There are a number of embodiments of the diary assistant, the first of which enables a single diary entry to be scheduled over a single day, and may be referred to as a local mode of diary entry. When the user invokes the diary, a diary screen is displayed on the display 103 (shown in Figure 1), as shown in Figure 7. This may be achieved either by typing an appropriate command at the command prompt or by activating the diary icon displayed on the screen 103, which icon forms part of the assistant software suite.

Please amend the paragraph beginning at page 19, line 27, as follows:

The user is also prompted to indicate in window 607 whether the event described in window 605 is interruptible or not i.e. whether the user does not want to be disturbed during the duration of the diary entry, e.g. during an important meeting. These parameters defining the diary entry may be described as constraints of the entry. The user is also prompted to enter a deadline day in window 619 and a deadline time in window 621.

Please amend the paragraph beginning at page 30, line 4, as follows:

In the present embodiment, where tasks are inter-linked, typically one of the tasks acts as an anchor for the other tasks. Referring to the above example tasks of a presentation, preparing a report and preparing the presentation itself, the presentation acts as an anchor for the other tasks. Thus, with reference to Figure 13, the anchor task T1 1301 is first added to the task plan, and all other tasks are constrained by this task, either directly or indirectly. In the task plan editor 1304, this task T1 may appear red, and all other tasks may appear green, thus distinguishing the main task from other tasks. The precedence is unidirectional, as symbolically indicated by the arrows 1309. This means that if a third task ~~T3~~ forming a task element of a specific task plan (which includes, say, 5 tasks including T1, ~~T2, T3, T4, T5~~, listed in order of dependency constraint) is moved to a different time, only ~~T4 and T5~~ the fourth and fifth tasks will be re-scheduled by the diary as a result of the move. In this example, task T1 is the anchor task, and as it is higher up the inter-task hierarchy than ~~T3~~ the third task, it is unaffected by the move. The dependency constraint may be given by the shortest path to the main task as dictated by

the arrows, together with the links, and the order in which tasks are constrained follows a directed a-cyclic graph.

Please amend the paragraph beginning at page 30, line 22, as follows:

Tasks may be added to a plan via menu option 1311, which enables the user to specify a task description, either explicitly in 1317 or by selecting from a pick list 1321, a duration of task 1315, and any additional temporal constraints particular to the task in question via dialogue box 1323. The user may also enter a deadline day in window 1319 and a deadline time in window 1320. Once added to the plan, the tasks may be edited, moved or deleted either by double clicking on the box in question, dragging the box around the screen, or selecting an appropriate menu option. The links 1307 and arrows 1309 may be similarly added to and edited in the task plan.

Please amend the paragraph beginning at page 31, line 11, as follows:

~~S13.1~~ First step: The assistant 211 orders all of the tasks elements, or tasks, according to their dependencies. Thus the most constrained tasks, such as task T1, appear first, and the least constrained tasks appear last, where a measure of the degree of constraint may be the number of possible periods that could be assigned to a task (determined by the fuzzy precedence on links 1307) together with the inter-task order (determined by the arrows 1309);

Please amend the paragraph beginning at page 31, line 17, as follows:

~~S13.2~~ Second step: Once the tasks are in order, they are scheduled one by one, following the above order. The search applied to schedule the tasks may be a standard “depth-first with backtracking” method, described in step S10.3, in which tasks are assigned timeslots or time periods in order, such that in the event of not reaching a solution, the search backtracks to an earlier point and tries an alternative timeslot or time period.

Please amend the paragraph beginning at page 48, line 2, as follows:

Figure 20 illustrates how the suggestion message 1603 may be displayed to the user. The screen of display 103 (Figure 1) is shown with a work area 2001 on which data processing is carried out. The status bar 2003 is shown below the work area. Thus, the user may be operating a word processor to prepare a document. When an incoming email is received, a mail icon 2007 is displayed on the status bar 2003. This indicates the arrival of the email but not its content. Thus, the user must decide whether to stop word processing and open the newly arrived email or whether to continue word processing. If the email is of peripheral importance, it would be better to continue with the word-processing rather than break concentration. In accordance with the functionality provided by email assistant, the user moves the mouse cursor 2006 onto the mail icon ~~2003~~2007, which results in a mail priority window 2005 being displayed. The mail window 2005 may contain a message selected according to Table 1 above, depending on the suggestion 1603 made by the Bayes net arrangement shown in Figure 16, along with the sender's details, the size and subject of the email, and may list the recipients (s).

Please amend the paragraph beginning at page 51, line 3, as follows:

A second embodiment of apparatus for processing of communications received by a user over a communications link is a telephone assistant, which is generally similar to the first embodiment described above, for which a description of the operative terms has been given. The telephone assistant 207 is used to manage a user's incoming telephone calls by performing call screening on incoming phone calls. The calling line identifier (CLI) of incoming calls may generally be referred to as identification information of the phone call.

Please amend the paragraph beginning at page 51, line 18, as follows:

Referring to Figures 22 and 23a, the priority associated with each caller may be represented in a Bayes net 2301 tree, located within the arrangement 2201, where each branch of the tree 2301 represents a caller that the user may expect to receive a call from 2303, 2305, 2307. There may be an additional branch, represented as 'other' 2309 in Figure 23a, which is used as a default to filter calls from unknown callers. The CLI of incoming calls may be used as identification data in the Bayes net 2301, such that when an incoming call is received, the telephone assistant 207 uses the CLI to search a database for the corresponding name of the caller. This database may be either stored within the telephone assistant or within a user profile, preferably located centrally in the database 247, to be accessed by the telephone assistant 207.

Please amend the paragraph beginning at page 51, line 31, as follows:

The conditional probabilities 2311, 2313, 2315, 2316 of the Bayes net tree 2301 are initially set so that all of the calls are accepted. The telephone assistant 207 can then observe how the user manages the calls, and refine the probabilities within the Bayes net tree 2301 in a manner similar to that described in the first embodiment.

Please amend the paragraph beginning at page 52, line 4, as follows:

The Bayes net arrangement 2201 may also receive data 2207 from the diary assistant 211, relating to diary entries which indicate that the user has planned certain activities relating to the caller identified as described above. This data is incorporated in a second Bayes net ~~2317~~2399, shown in Figure 23b, which is also located within the arrangement 2201. The second net 2317 has, as inputs, the importance of the call based on the caller's identity, which is input from the Bayes net tree 2301, together with information relating to whether or not the user has a meeting scheduled with the caller. This information may be further categorised by proximity of meeting, meeting type and frequency of calls:

Please amend the paragraph beginning at page 54, line 15, as follows:

Assuming that the user interface 2401 has been set to 'filter ~~emails~~'calls' at 2405, this computed priority will be compared to the selected value and the call processed accordingly.

Please amend the paragraph beginning at page 54, line 21, as follows:

One implementation 2501 of the second embodiment uses BT Callscape® 2503 to interact with a Public Service Telephone Network (PSTN) analogue telephone line, as shown in Figure 25 of the accompanying drawings. Callscape is a product of British Telecommunications Public Limited Company which provides computer telephony integration (CTI) and calling line identification (CLI). It is available as an external hardware device that connects to the serial port of a computer. Telephony events (lifting of receiver, receiving incoming calls, sending outgoing calls) may be processed by an application running on the computer. The telephone may be a Meridian® digital phone 2505, which uses a Meridian Communication adapter as a hardware board located in the telephone handset, which also connects to the serial port of the computer. The assistant 207 may be implemented in the Java programming language, and the arrival of a phone call may be detected by a thread 2507, which provides a server front end to the Callscape client. The assistant 207 may interface with Callscape 2503 via an ActiveX component having a Visual Basic layer to initiate connection to the telephone assistant server. Incoming calls are thus signalled to the thread, which then notifies the telephone assistant 207 with the CLI. The telephone assistant 207 may interface, for example, via a Hugin application program interface (“Hugin API (JNI)”).

Please amend the paragraph beginning at page 57, line 9, as follows:

2804 The state is set to Background after reaching state 2803 when further activity is detected from the first sensor 2701 but no change of state is detected from the second data source 2703. If the second data source 2703 persistently fails to detect any

activity 2806, the system will return to the Absent state, but if activity is detected at the second data source 2703, the state is set to Present.

Please amend the paragraph beginning at page 58, line 7, as follows:

2. S29.2 Detect the rate at which the user operates a text key, in this case the "return" key. Heavy use of the return key 0 indicates a high error rate and hence, possibly, high stress. Use of other keys such as control keys and mouse movement can also be analysed in order to detect usage, as an indication of stress, at step S29.2. The stress level may be ranked at step S29.3.

Please amend the paragraph beginning at page 65, line 1, as follows:

~~CLAIMS~~ What is claimed is.